

Abstract

Young children shift meanings across multiple modes long before they have mastered formal writing skills. In a digital age, children are socialised into a wide range of new digital media conventions in the home, at school, and in community-based settings. This article draws on longitudinal classroom research with a culturally diverse cohort of eight-year old children, to advance new understandings about children's engagement in transmediation in the context of digital media creation. The author illuminates three key principles of transmediation using multimodal snapshots of storyboard images, digital movie frames, and online comics. Insights about transmediation are developed through dialogue with the children about their thought processes and intentions for their multimedia creations.

“I’m making it different to the book”: Transmediation in Young Children’s Multimodal and Digital Texts

Melissa¹, a reluctant eight-year old writer, created this single storyboard frame in response to an oral reading of a chapter in Roald Dahl’s popular novel, *The BFG – Big Friendly Giant* (Figure 1).

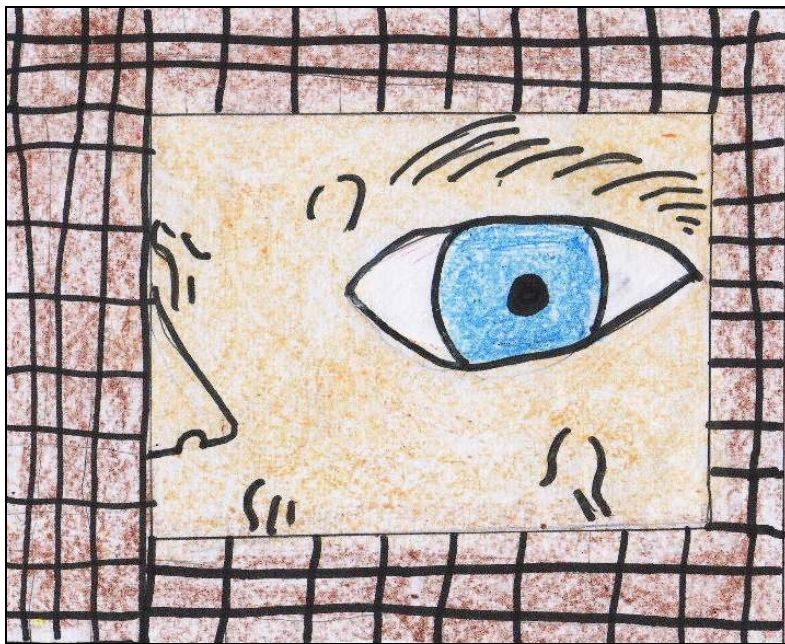


Figure 1 “There at the window...was...the Giant Person, staring in. The flashing black eyes were fixed on Sophie’s bed” (Dahl, 1982, p.8).

This close-up image of the giant’s flashing eye, made salient by its proportions and framing within Sophie’s open dormitory window, translates Roald Dahl’s original text with generative creativity. This process required inventing connections between two sign-systems or modes – written words and images.

Transmediation

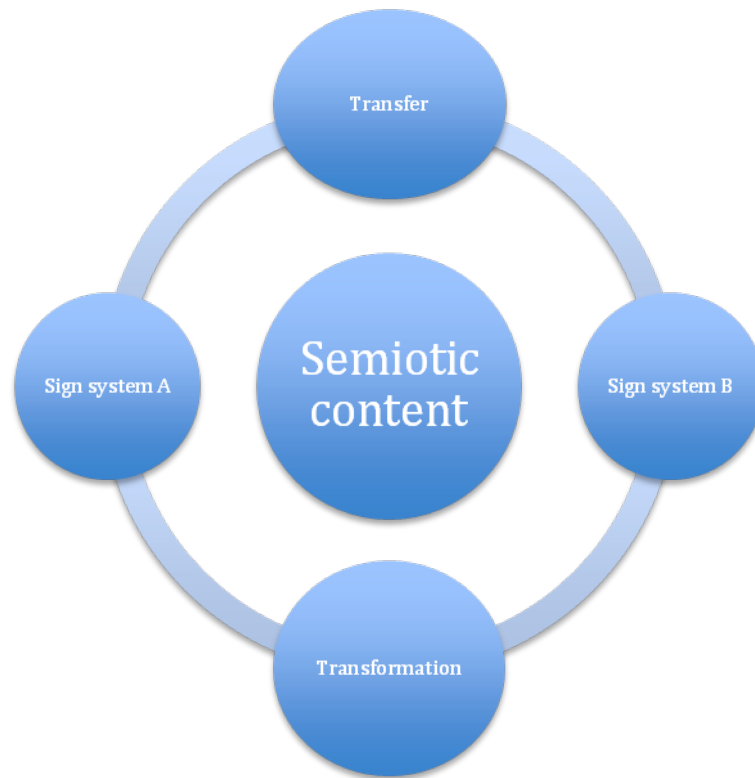
Melissa’s translation of semiotic content across sign-making systems constitutes a process of transformation called transmediation – a central process of knowledge generation in young children’s text creation (Siegel, 2006). Transmediation denotes the translation of content from one sign system into another. A syntactic concept, Suhor (1984, p. 250) coined this

term to describe the structure of sign-systems and their conventions – written word, drawing, dance, music, web design, video production – and the connections between them for making sense of human experience.

Transmediation is a fundamental process in young children's meaning making. The term has gradually receded in the literature with the dominance of work by Kress (1996), who describes the same process of shifting "semiotic material" across modes, but refers to this principle as "transduction" within his social semiotic account of learning. Kress describes transduction as a process in which something that is configured or shaped in one or more modes is reconfigured, or reshaped, according the affordances of quite a different mode (Kress, 2003, p.47).

In this paper, I return to the original nomenclature, "transmediation", to acknowledge the genesis of the concept in the literature by Charles Suhor (1984, 1992), extended by Semali (2002; 2001), Siegel (1995, 2006) and others (Short, et al., 2000; Wright, 2007). Each sign system or mode has unique organisational principles, involving elements and conventions that do not have precisely equivalent meanings (Semali, et al., 2001). The term "modes" and "sign-systems" are used interchangeably here to describe socially and culturally shaped resources or semiotic structures for making meaning. They are organised, regular, socially specific means of representation, such as writing, drawing, dance, image, music or mathematics (Kress, et al., 2008, p.171; Suhor, 1984). The lack of equivalence between modes is the catalyst for transmediation, which is represented in Figure 2 as a process involving the transformation of knowledge by varying degrees.

Figure 2 Transmediation: Transformation of knowledge by degrees



The diagram above represents the continuous process of transmediation as a continuum of meaning transformation. I demonstrate how transmediation in children's textual practices can range from the simple transfer of semiotic content, such as drawing a picture to match the words in a story, to a substantial transformation of semiotic content, such as drawing a picture that depicts a newly invented narrative. Given that modes or sign-systems have different materiality, shaped by histories of cultural work, there can never be a perfect translation from one mode to another (Kress, et al., 2008). In shifting meanings from the visual and spatial instantiations, there is always some degree of change.

Semiotics and Multimodality in Children's Digital Composing

It has been well established that children combine multimodal symbolic systems, such as talking, drawing, singing, and role-playing, long before their communicative interests can be served by the written linguistic forms of their culture (Kress, 1997; Kress, et al., 2008; Siegel, 2006). Multimodality is defined here as the interrelationship of two or more modes

(Author, 2010c). Print-based reading and writing has always been multimodal, since these practices require the interpretation or design of images, words, spatial layout, and other modes of representation (Jewitt, 2005). However, in the new media-based environment, there is heightened interest in the role that multimodal ensembles of images, sounds, animations, and other modes play in meaning making (Author, 2009). Rather than regarding written language as the sole channel for learning and generating knowledge, it is argued here that young children learn and communicate through multiple sign systems or modes – each of which offers a distinctive way of making meaning (Kress, et al., 2008). The increasing ease of producing multimodal and digital texts, such as web pages, podcasts, and other user-generated online content, provides impetus for understanding the semiotic process of transmediation.

Research on children's composing processes within social semiotic frameworks has begun to focus on digital media, extending semiotic principles established in studies of print-based writing to the incorporation of multiple media in compositions (Ranker, 2009). These have included exploring sign making in video-interaction (Adami, 2009), young filmmakers' deployments of semiotic tools (Gilje, 2010), young writers' incorporation of multimedia into their writing as compositional elements (Dyson, 2001; Ranker, 2007), and the semiotic potentials of combining modes in digital storytelling (Hull, et al., 2005). These studies have contributed to understanding how children combine, shift, or transform meanings in multimodal contexts of digital composition.

The multiplicity of communications channels and media tied to the expansion of mass media, multimedia, and the internet has transformed the way children are socialised in textual practices (Author, 2010b; New London Group, 2000). In a digital age it is evident that speech and print-based writing are necessary, but not sufficient for young children's communication interests. Many young children are becoming socialised into digital forms of communication before they begin formal schooling, such as using drawing software and interactive web sites. These social practices frequently require users to transmediate meanings flexibly across different modes and media (Author, 2010; Jewitt, 2008).

Purpose and Theoretical Framework

In this study I ask, “What are the principles that govern the semiotic process of transmediation when children compose digital and multimodal texts?” I aim to show how children as meaning makers of digital texts – storyboard frames, documentary films, and online comics – shifted semiotic content from one mode or sign-system to another through transmediation. I analyse the epistemological significance of transmediation as a form of knowledge reproduction or transformation in children's digital composing.

Social semiotics provides a conceptual framework in this study because explanations of textual forms must attend to their social origins (Bezemer, 2008). I attend to the potentials and constraints of sign-making systems — storyboards, moving images, written words, dramatic performance, online comic creation, and digital editing. I equally give attention to the potentials and constraints of media — both printed media, such as children's storyboard drawings and writing, and electronic media, such as online comics and digitally edited documentary films. I demonstrate three key principles of transmediation that are fundamental in understanding children's multimodal and digital meaning making.

1. Transmediation is more than the simple reproduction of knowledge, and involves a process of knowledge transformation by degrees.
2. Transmediation involves a process of continual adaptation of intentions for representing knowledge in response to the possibilities and limitations of sign making systems, including the affordances of digital systems.
3. Transmediation is central to digital text production because it involves translating semiotic content via the discrete sign making systems inherent in software interfaces.

Research Description – Design-Based Research

The findings reported here were generated in the context of a four-year, design-based research project. Design based research is interventionist – it investigates the possibility for educational improvement rather than merely examining what already exists (Brown, et al., 1994; Cobb, et al.,

2003). One of the main aims of the larger study was to prototype the use of print and digital media production for literacy learning among ethnically and economically marginalised students. A variety of print and digital media collaborative projects were generated with interested teachers across the school. The aim of the research component reported here was to theorise the students' shifting of meanings – transmediation – across sign-systems in the context of media-based textual design.

Three Year 4 teachers and their students (ages 8.5-9.5 years) were chosen as the cohort to receive the highest level of training and support by the university researchers, including 6 hours per week (2 hours per class) of teaching and in-class support by a specialist media arts teacher and literacy researcher. Students in three classes were introduced to a range of digital media design projects during the literacy block within the timetable each week, and the researcher visited the school three times per week as a participant observer and support person for teaching and assessment within the English curriculum. The outcomes were also matched to Media Essential Learnings which form part of the Queensland Art Curriculum (Queensland Studies Authority, 2007).

Site Description

Woodvale Primary School has a student population drawn from suburbs in an economically and socially disadvantaged region of Southeast Queensland, including the school's adjacent State Housing Authority area. Some 94% of students in the school are identified as being in the bottom quartile according to the federal government's Index of Community Socio-Educational Advantage (ICSEA), with only 5% in the lower-middle quartile and 0% in the top quartile. The school has a total population of 634 students from Preparatory to Year 7, including significant proportions of Aboriginal and Torres Strait Islander students (10% of total), children of Pacific Island origin, and English as Second Language (ESL) learners.

The mean Year 3 writing scores of the same cohort the year prior to the study were 30% below the national mean for all Year 3 students in Australia, and 10% below Year 3 students in statistically similar schools. The mean spelling scores were 18% below the national mean for Year 3 students,

and grammar and punctuation scores were 24% below the mean of Year 3 students across the nation.

Description of Intervention

The data in this study were collected in the second year of a digital media intervention, which was preceded by eighteen months of building rapport with school staff and teachers in the school - providing regular media workshops, professional development, curriculum planning, and in-class learning support for students in writing. A series of digital media-based lessons were taught by a specialist media arts teacher-researcher, in collaboration with a literacy educator from the university, and three classroom teachers. The teachers came to the study with varied levels of teaching experience, from two years to senior, with little previous experience of the digital software introduced in the research.

At the beginning of the second year, the media arts teacher-researcher began modelling lessons for digital text production. The media-based literacy lessons were implemented twice weekly for two hours in each classroom, with a cohort of 75 students enrolled in Year 4. The program included introducing students to the features of new digital text types – blog pages, podcasts, micro-documentaries, web profiles, digital stories, and online comics. They were also introduced to new metalanguages to describe media texts (e.g. shot types, cut-a-ways, transitions), and technical proficiencies with a suite of Apple media software (Figure 3).

[\[Insert Figure 3 – Semester I Overview\]](#)

Figure 3 – Semester I Overview

In the first six months of the media-based program, the media arts teacher-researcher had the primary responsibility for implementing the digital lessons, which were planned in collaboration with teachers and researchers. In the second six months, the responsibility for implementing media-based literacy was gradually released to the classroom teachers, who each took the program in unique directions. By the fourth quarter, the teachers were planning and implementing media-based writing lessons without assistance, revisiting and extending the media-based practices introduced in first semester.

During the second year of the current study, the school invested in a library with 25 Apple computers to be shared by all classes in the Preparatory to Year 7 primary school (Students aged 4.5-12.5 years). Each classroom also had 4 Apple computers of an earlier generation that were sometimes awaiting repair. In the first year, the university also purchased 12 Apple Mac laptops on a trolley, and 15 digital flip cams (compact video cameras) to assist the Year 4 teachers to integrate media production in their literacy lessons, and to facilitate researcher access to the students' digital artefacts.

Data Collection and Analysis

The data sets for this component of the project, funded by the Australian Research Councilⁱⁱ, included: a) Over two hundred print and digital artefacts produced by eight-year olds – drawings, storyboards, scripts, digital movies, and comics; b) Audio recorded focus groups and dialogue with individuals about transmediation; and c) Sixty focused lesson observations. Screen shots of work samples reproduced in this article were selected from the total corpus of data, which repeatedly demonstrated the processes of transmediationⁱⁱⁱ. Multimodal semiotic analysis was used to compare similarly intended meanings across multiple corresponding texts, such as students' movie storyboard frames, script segments, movie frames, and their commentary about the design process.

Findings

Transmediation: Degrees of Transformation

Described below is a task in which students were required to draw a single image adapted from *The BFG*, by Roald Dahl. Over several weeks, the children had listened to the reading of the first half of the novel, in which a giant captured Sophie, an orphan. The giant's arms had extended through the window to snatch her from the bed in the dead of night, to take her to his cave in the Giant Country. The teacher of this lesson explained that they would "picture things" from the BFG and "show it as a storyboard". She clarified that the purpose of storyboards is to plan "frames" for their movie to "get our idea across". To prepare the students for this task, the children

participated in an oral retelling of the main events in the narrative as the classroom teacher recorded their ideas using words on a chart (Figure 4).

- Events Snapshots from the BFG
1. Sophie got snatched from the orphanage
 2. Sophie taken to the cave and sits on the BFG's table.
 3. BFG holding the Snozzcumber.
 4. BFG and Sophie are in the dream country.
 5. Sophie nearly got eaten by the Blood Bottler.
 6. BFG got tossed about.

Figure 4 Children's Oral Retelling of Events in the BFG

The teacher said, "We are going to talk about the pictures that we might draw on your storyboard of the BFG". She drew a storyboard frame on the whiteboard, with three overlapping frames to review shot types. The teacher engaged the students in a questioning sequence in which she reviewed three of the most salient shot types: long shot, medium shot, and close-up. For example, she asked, "If I was going to do a long shot of my person, where should I start?" The students supplied the correct answer: from the top of the head to the bottom of the legs. Then she asked: "What would I include if I was doing a medium long shot?" A girl replied, "From the top of the head to the waist." Finally, she asked, "What is included in a close-up?" Students identified that a close-up shot includes the top of the head to the shoulders. Each time, the teacher drew the appropriate frame, similar to "cropping" a digital image, using a square around the drawing of a person to indicate what was included or excluded in each shot.

Students were given a blank frame in which to draw their storyboard image, requiring them to recall events in the BFG. The teachers and researchers engaged in dialogue with students about the content of their storyboard frames, prompting the children to add details to clarify the context of the subjects represented. For example, they asked, "What's in your background here?" "That's in the cave – I can tell because you've put

the rounded curve of the cave.” “What else are you going to include?”

Lauren produced the drawing shown in Figure 5 below.



Figure 5 BFG Arm Coming to Get Sophie

Lauren’s storyboard frame matches the words of the narrative:

The next moment, a huge hand came snaking in through the window. This was followed by an arm, an arm as thick as a tree trunk, and the arm, the hand, the fingers were reaching out across the room towards Sophie’s bed (Dahl, 1982, p.8).

Lauren’s text demonstrates how the content of one sign system – words – was mapped onto the “expression plane” of image via drawing (Wright, 2007). This cross-channel of communication involved inventing connections and weaving between two very different symbolic forms. The meanings contained in Dahl’s sentences and words were shifted fluidly to recognisable iconic images that reinterpreted the text through a transformative process. Lauren described her drawing as a “long shot” of Sophie in her room at the orphanage. If translated into a scene within a film, she anticipated that it would be accompanied by sound effects of “heavy breathing”.

Lauren explained that she had included a lamp and a torch beside the bed “in case Sophie got scared in the dark”. When I inquired about her representations of a cupboard, bedside table, and the arrangement of furniture in the drawing, Lauren explained that these were features of her

own bedroom – “I’m making it different to the book”. Lauren drew upon her own cultural experiences, such as her fears of the dark, and the material texts of her own lifeworld, to generate a visual text that interacts with Dahl’s text in a way that had never occurred in precisely the same way before. This representation involved more than a simple reproduction or transfer of semiotic content from word to image, since the process of crossing modes involved imagining what was not made explicit via words alone.



Figure 6 Sophie Getting Snatched.

Rachel's image in Figure 6 exemplifies the transmedial process of meaning-making as she adapted the text: “She flew across the dormitory and jumped into her bed and hid under the blanket... still as a mouse... The fingers were reaching out across the room towards Sophie's bed” (Dahl, 1982, p.8). Designated as an extreme long shot, Rachel wrote that the accompanying music would be “scary and shaking”.

Rachel's image drew upon her knowledge of a “dormitory” as a shared sleeping space in the orphanage, making text-world-text connections. This act of translating meaning from one sign system to another allowed Rachel to engage in generative and reflective thinking as she projected her visualisation of the room using a one-point perspective drawing.

A line dividing the wall from the floor created a single vanishing point. Rachel visualised beds aligned along the wall, diminishing in size

according to distance. While other characters were not mentioned in this section of the novel, Rachel inferred the presence of other orphans also preparing for bed, envisaging the ordering of time and activity in orphanages. She invented these connections between word and image, making new meanings through connections that did not exist *a priori*. It illustrates the generative potential of transmediation, even in a limiting case in which students were required to produce a seemingly literal translation of events in a novel.



Figure 7 Hand and Bed

Jack's drawing provides an example of how the process of transmediating images to words can involve incremental changes in understanding for the learner (Figure 7). When we first approached Jack he implored, "Mine is just a hand and the bed. I don't know what else to draw." Jack was encouraged to add background objects to contextualise the scene, and he proceeded to add cracks in the wall, a patch on the giant's elbow, and a spider's web to communicate the passage of time. By translating his understanding of the BFG into another sign system, experimenting with image enabled Jack to find an entry into the text. The movement across modes played an important role in deepening his understanding of possible meanings, resulting in the augmentation of knowledge. This confirms related

studies that demonstrate how drawing serves an important meaning-making resource for young students who are learning to write (Harste, et al., 1984; Moore, et al., 1993; Norris, 2004).

This analysis of visual artefacts created by eight-year old students demonstrates that even when children reproduce content via a different sign system, there is potential for generative and reflective thinking, because text users create new connections between multiple modes. Reinterpreting semiotic content from its original representation as a novel required more from the students than the simple transfer or reproduction of meaning, since it involved interpreting meaning between symbol systems, involving different degrees of transformation by users.

Transmediation: A Continual Process of Adaptation to Affordances

In this section, I illustrate the centrality of adaptation in transmedial processes using filmic conventions, drawing from students' collaborative production of digital micro-documentaries, also based on *The BFG*. The micro-documentaries were to include an introduction by a narrator, an observation, re-enactment of events, and an interview of the main characters. The students were encouraged not to reproduce events in the *BFG*, but to change the story by imagining different events to those in the plot. For example, students interviewed the *BFG* about imagined events, such as his decision to attend school, his marriage to Sophie, and his honorary role as the president of the Giant Country.

Students spent several lessons learning the genre and textual features of micro-documentaries, from storyboard design and script writing, to acting, filming, and digital editing. The process of translating semiotic content, expressed as images and words in a storyboard and script, to the realisation of this content on the screen involves multiple acts of transmediation. I have chosen examples of transmediation because storyboards are intended to convey similar meanings as the final film, but through different modes.

Transmediation between still and moving images involved adaptation.

Transmediation involves a search for commonality between sign-making systems (Siegel, 2006). In the following example, meanings were

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shifted from still image drawings to moving screen images. Both still and moving images can be classified by shot type (e.g. close-up, medium, and long shot). When asked to compare the shot types, the students identified that they had relied on the use of medium shots in the final movie as opposed to the combination of medium and long shots in the storyboard.

Brianna, Ethan, and Sarah translated the content of their storyboard to create a final micro documentary that was very similar to their original intentions. The children were asked to compare their storyboard to the final movie, and to explain any differences that they observed.

Researcher: Did the shot types end up looking like these ones when you filmed it in your movie?

Children: No. I don’t think so.

Ethan: Because all of them are medium shots in the movie.

Researcher: So you said that you were going to do medium shots, and you said that you’d do a long shot there – the Queen with Sophie?



Let’s go and pack your stuff.	Do you want me to help pack your stuff?
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Figure 8 Queen Adopts Sophie

Children: Yes.

Researcher: You wrote, “Go and pack your stuff!” Did you actually use a long shot there?

Children: Not really. No.

Researcher: So why did you decide at the time of filming the movie that the long shot wasn’t going to be what you needed?

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Ethan: ...Because you couldn't see from that far away. You couldn't see their body or their face – all you could see was a black shadow.

Researcher: Right. So the lighting made it a bit difficult to see their face?

Ethan: But when you went close you could see it more.

In the process of transmediating semiotic content, expressed as words and drawings in the storyboard, to moving images on the screen, the students adapted to the affordances and constraints of the filmic medium. In the transcript above, Ethan reveals that his decision to use a medium shot, instead of the intended long shot was a conscious decision to adapt to the unanticipated lighting conditions and constraints of the filmic medium. This example illustrates that generative possibilities in transmediation arise out of the heterogeneity of modes.

Example of transmediation and adaptation to affordances: Characterisation in dramatic performance

When transmediating semiotic content from the storyboard script to spoken word, it was observed that the children frequently modified the dialogue. For example, in the illustration above, the group had scripted the Queen's words: "Let's go and pack your stuff." When Brianna played the role of the Queen in this scene, she changed the mood of the sentence from imperative to interrogative, formulating it as a question. She modified the vocabulary choice, and used an imitation of a thick, Scottish accent, "Do yer want me to he..elp pack yer stoof?" The shifting of meanings from written to the spoken word was instantiated with originality rather than reproduction. Similarly, Lauren explained that they changed their script when they acted to "get it more in character". Realising the affordances of speech for projecting the personality of a character, they adapted the script to better communicate their intended meanings.

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Example of transmediation as adaptation to affordances: Overcoming Material Resource Constraints

The inconsistencies between semiotic codes also called for adaptation in response to the affordances of the filmic medium. This principle was observed repeatedly in the students' artefacts, illuminated by their articulation of their thinking in the focus groups, which occurred during digital editing.

Researcher: How does this storyboard relate to this movie timeline up here? In the first frame of the movie, you're sitting down narrating. Is that that same scene there? [Pointing to first storyboard frame].

Rachel: It's here – at the top. We didn't really do it exactly the same 'cause I'm sitting down and I don't have a microphone (Figure 12).

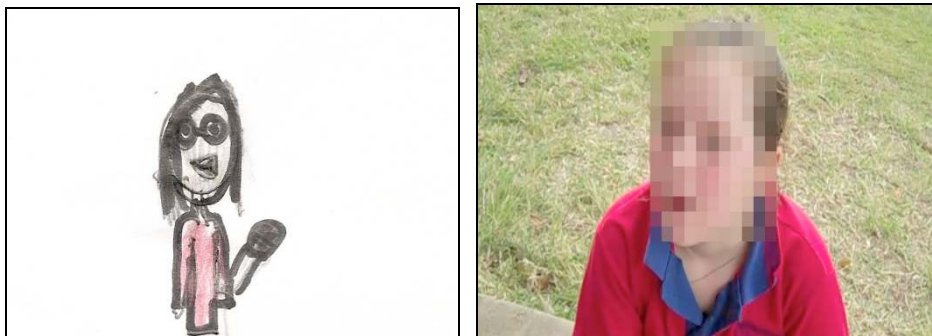


Figure 9 "Today we are telling you how the BFG becomes president".

Researcher: Right. And what's this part here? (Figure 9)



Figure 10 "There Sophie is watching the BFG go to school".

Rachel: Ah, that's when I'm going to school (as the BFG). It is the same but the only thing that's different is we don't have all these other kids. We only have filmed one kid running away.

Researcher: So why did you change it as you actually filmed it?

Jade: We only had one person to act.

Researcher: Oh, so she was your "walk on" to make it look like a school. And what happened in these scenes here? How does that match up to your storyboard? (Figure 11)

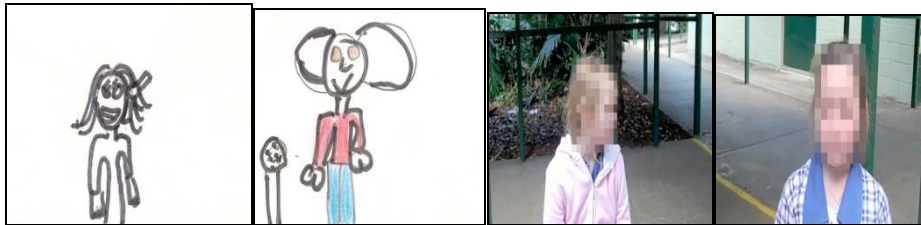


Figure 11 Q: "Why did you want to go to school?" A: "Because I wanted to learn how to speak and spell. I also wanted to read more books".

Rachel: Yes, it is the interview between Jade and the BFG. Jade is asking the questions. These match up. They're the same questions. Like, the BFG there – and the BFG there. We tried putting our hands up around our ears for the BFG, but it didn't work. We tried to make it the same as that (storyboard)

Jade: But it looked silly, because they could see our arms.

Researcher: Right, so... it didn't quite have the effect that you wanted.

This discussion with Rachel and Jade demonstrates that the girls engaged in a continual and flexible process of adaptation of their storyboard as they sought to cross the gap between different modes. The adaptation of semiotic content did not occur by default, but was a consequence of their

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intended action. In the first instance, the girls made changes to accommodate the unavailability of props, such as a chair and microphone. In the second scene of the BFG at school, the imagined crowd scene was easy to portray with a pencil, but required more actors than was permitted in one filming group. To overcome this constraint, they borrowed a peer from another filming group to be a “walk on”.

In the third scene, the intention to use their arms to create big ears did not achieve the visual effect they had imagined, and the footage was subsequently deleted. The audience would have to infer from the dialogue that Rachel was the BFG. These examples highlight the tension between similarity and difference when transmediating semiotic content from one form to another. Transmediation establishes an anomaly for the learner in the absence of one-to-one correspondence between sign-making conventions (Siegel, 2006). This tension invites learners to invent a way to cross this gap by engaging in both evaluative and generative thinking.

Researcher: And what about shot types – were you thinking much about shot types?

Rachel: We were thinking about like, doing medium shots and stuff, but some of it, it just didn’t look right (on the screen) so we changed it a bit.

Researcher: Right. So when you saw it on film it looked different to what you expected?

Rachel: Yeah, like the marriage – it was supposed to be a long shot but it didn’t look right so we did a close-up.

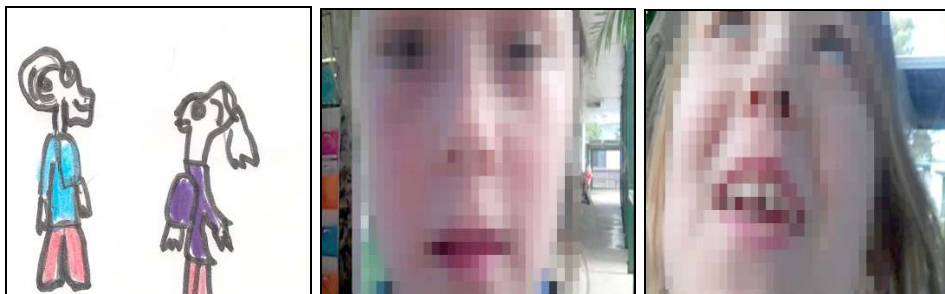


Figure 12 “I take this lovely lady to be my bride”. “I do take this lovely giant to be my husband.”

Transmediation involved a process of continually anticipating, evaluating, and revising their intentions as they shifted meanings across modes. In the example above, the girls modified the use of shot type to better realise their intended message in a screen-based format. They later reasoned that the close up shot overcome the absence of costumes to portray their respective roles in the marriage ceremony. The girls used the framing of the screen composition to conceal their school uniforms, requiring the viewers to imagine the wedding costumes that extended beyond the boundaries of the screen. This example clearly illustrates how drawing still images and filming the moving image with a digital camera have different potentials for meaning. Moving image combines the affordances of image, which is spatially organised, with a temporal organisation – it unfolds in time (Bezemer, et al., 2008). These modes offer distinct resources, so that in the process of transmediating meanings from drawings to film, there are “gains” (e.g. close-up shots can be used for selectivity) and “losses” (e.g. imagined actors and propos in drawings must be materialised in film) (Bezemer, et al., 2008).

Example of transmediation as adaption to affordances: Digital editing techniques.

The process of transmediation involved anticipating and experiencing the affordances of the sign making conventions. The students reflected on this journey of discovery, having completed their first film.

Rachel: I imagined us doing all the things over here (acting), but I didn’t imagine all the effects, cut-a-ways, titles, transitions, and stuff. It’s not just playing characters (Figure 13)



Figure 13 Example of Cut-a-way, Title, and Transition

Researcher: If you could do this again, now that you've been through the process, what would you probably do a bit differently next time?

Rachel: If we do it again, probably add, like bring costumes, and actually play the person better, and we know how to film. And we actually know how to put it together instead of having all this help.

Having utilised filmic media and conventions for the first time, the children reflected that there were affordances of filmmaking that were unanticipated. They were familiar with communicating through drama, but the use of digital editing techniques, such as inserting cut-a-ways, titles, transitions, and credits were remote from their world of experience. The children had to learn "how to put it together" – an apt way of describing movement across and between modes as they forged new connections.

Filming an innovation of *The BFG* as a micro-documentary provided the opportunity for the children to represent ideas through multiple modes, supporting more complex and creative thinking, because each sign system has different potentials for meaning. The transmedial work from novel to storyboard to film allowed different modes to become tools for thinking, imagining, and publicising their ideas (Short, et al., 2000).

Transmediation: Fundamental to Digital Text Creation

The role of digital technologies in understanding transmediation has been little explored in the literature – the dominant emphasis has been on writing, drawing, and telling (Cox, 2005; Siegel, 1995; Wright, 2007). I argue here that transmediation is central to digital text production because it involves translating semiotic content via the discrete sign-making systems that are inherent in software interfaces.

In the context of observing students engaged in digital media production, it was recognised that each digital interface is more than a simple tool for sign making, akin to a pencil or paintbrush. Theorists of semiotics have conceptualised digital technologies as mediating tools. Yet what has not been acknowledged is that each digital interface requires users to understand a discrete sign-making system (e.g. icons, navigational tools, drop-down

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menus), with an inherent logic that must be understood in order to mediate meaning.

I argue here that crossing from print to digital modes adds an important layer of complexity to text and knowledge creation if we think of software only as tools, akin to a brush, pen, or typewriter (Jewitt, 2006, p.24). The machinery of the computer is indeed a tool, but the ever-expanding array of media software systems each draws upon independent iconic systems of meaning. Arguably, while these systems possess some common features, they also differ from each other in multiple ways to competing software interfaces.

To illustrate how transmediation functions in the context of digital text production, I will use another limiting case in which the direct reproduction of semiotic content was seemingly required. The children were required to draft, using pencil on paper, a comic that contained only three frames, and then present it digitally via a popular online comic creator (makebeliefscomix.com). The teacher provided the children with fifty minutes of direct instruction in the classroom using an online projection of the comic creator website on her electronic whiteboard (Figure 14). To prepare students for the allocated time in the computer laboratory, she required the students to initially draft their comics on blank paper.

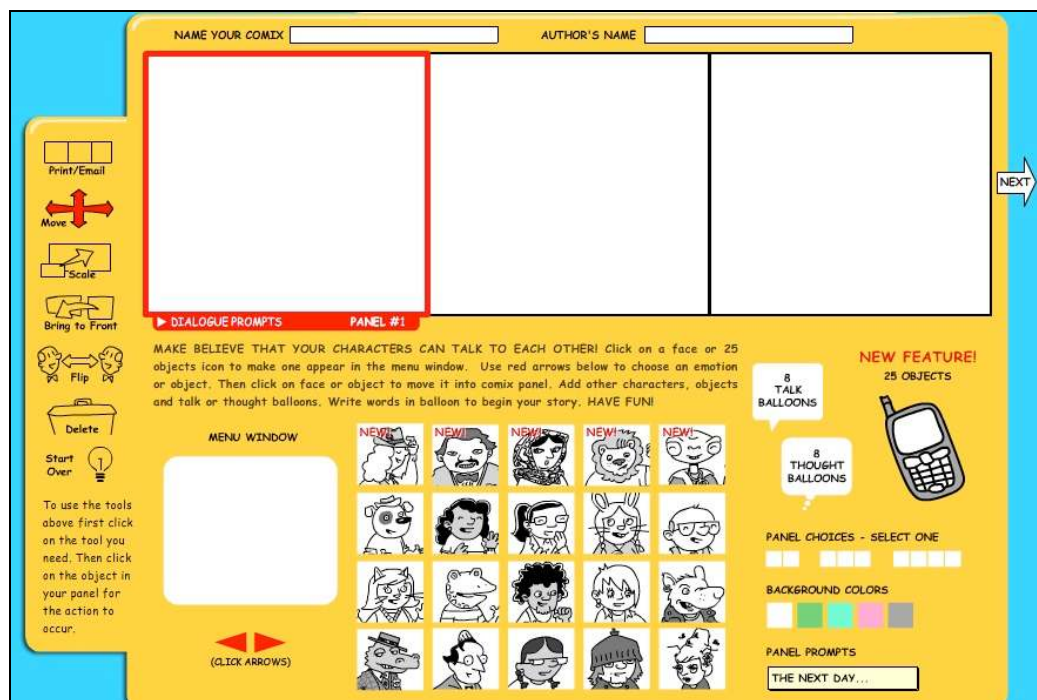


Figure 14 Screen adapted with permission from © Make Beliefs Comix

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A transcript of the second lesson, recorded immediately prior to the students translating their print based drafts to the screen, is shown here. It demonstrates how the teacher, Margaret, focused the students' attention on the unique sign making system of this digital interface:

Margaret: What would I click on if I wanted to change the size of the characters – Barbara?

Barbara: Scale.

Margaret: That's right. If you click on scale, and then on the object, you can make it bigger or you can make it smaller (demonstrates object increasing and diminishing).

Margaret: Ok. I want to...flip him around and face him the other way. What do I do click on Jack?

Jack: Flip

Margaret: Click on "flip" and click on him (the object to apply the action). What if I want to get rid of him? Tristan – ah, Ethan?

Ethan: Um, just delete.

Margaret: Click on delete. He's still there.

Ethan: Then click on him.

Margaret: Click on him. Ok. I'm going to put him back up there. All right. I want to...move him around. Tristan – how do I make him move?

Tristan: Move.

Margaret: And you can click on him to make him move. Ok. Now I want a speech bubble. What do I want to do – Abigail?

Abigail: Go to that talk balloon.

Margaret: Click on "talk" and I can come over here (menu window) and choose different sizes of speech bubbles to fit my words. And it's important...to take note of which way that arrow is facing to change the size.

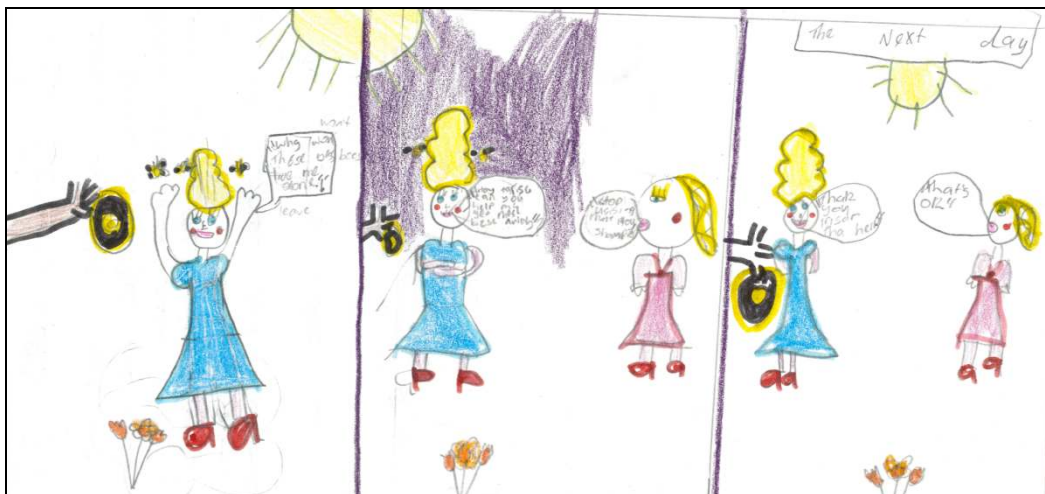
It is apparent here that the comic creator interface requires users to become familiar with a digital sign-making system that contains unique icons and functions for mediating textual production. In this second lesson introducing the comic creator, the teacher quickly reviews the students' new

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knowledge of a digital symbolic system that is both similar to, and different from, other sign-making systems. The digital interface is an original system of meaning making which must be acquired or learned through instruction and use, in a similar way to learning other modes, such as written English, musical notation, or perspective drawing.

The transmedial work involved in translating a print based comic to a digital presentation of similar content via an online comic creator is illustrated here. While the teacher anticipated that the children would reproduce their draft in an equivalent form via the digital software, less than a quarter of the children identified their final digital comic as the same or similar to their original draft. For most children, it was easier to create a different comic than to work within the constraints of the iconic user options for creating digital symbols of characters and objects.

Rachel chose to persist with her original comic design and work within the constraints of the digital interface. Rachel’s print-based comic centred on a character she had observed in the menu during the teacher’s online comic example who had bees in her sixties “beehive” hairstyle (Figure 15).



Speaker 1: “Why won’t these bees leave me alone?”	Speaker 1: “Hey There, Can you help me get these bees away?” Speaker 2: “Stop using that honey Shampoo?”	Speaker 1: “Thank you, Theresa. That helped.” Speaker 2: “That’s Ok!”
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Figure 16 Bad Hair Day - Draft

Comic



Figure 17 The Shampoo Problem

Rachel said she needed to adapt her original comic because, “I couldn’t get her, like, the bees out of her hair” (Figure 17). The central problem in Rachel’s comic was resolved by following the cartoon friend’s suggestion to “stop using that honey shampoo”. In the final frame of the draft, Rachel had drawn the character without the bees in her hair, but the digital comic creator did not have an image of the same character without bees. Rachel explained that to solve this problem, she found a digital character that looked similar, and transformed the ending – the character had changed her “whole look”. As Rachel explained about the original third frame, “The words didn’t make sense” in the new comic.

In this way, she strategically worked within the constraints and possibilities of the mediating technology to transmediate semiotic content from print to digital formats. Rachel used substitution to replace intended objects that were unavailable in the menu, with the available digital images generating new ideas. The absence of a ready-made link between the content and expression plane created an anomaly that set generative thinking in motion (Siegel, 1995).

A second example of this occurred in relation to the “talk bubble” that blocks the top of the character in the third frame. Rachel explained that this was done intentionally to conceal the cat-like ears to make the personified animal appear to be human. She overcame the lack of

equivalence between modes by positioning objects to conceal details of the images that did not communicate her intended meanings. Yet these inventions did not arise *ex nihilo*, that is, out of nothing, but were created from digital conventions.

These examples of online comic creation demonstrate that transmediation involved a process of continual adaptation of intentions for representing knowledge in response to the possibilities and limitations of the sign making systems, including those embedded in digital software. Users engaged in a continual process of problem solving, as they sought ways to work within the constraints and possibilities of the digital conventions to communicate meaning.

Conclusion

Transmediation is fundamental to the increasingly important role of digital and media-based technologies in communication today, requiring the recasting of meaning through the context and expression plane of multiple semiotic structures. The multimodality of textual production and use in young children's meaning making, and in society, necessitates that students learn to transmediate flexibly between modes.

This article has demonstrated that transmediation involves transformation by degrees. Even in a limiting case of seemingly minimal knowledge generation, such as retelling scenes in a novel through drawing, or translating a print-based comic to a digital format, a degree of transformation is discernable. This is because each sign system has unique organisational principles, involving elements and conventions that do not have precisely equivalent meanings. The potential for generative thinking was heightened as the children made connections between multiple modes (Siegel, 1995, p.458).

In the context of filmmaking, transmediation was theorised as a process of continual adaptation of intentions for representing knowledge in response to the possibilities and limitations of sign-making systems and their meaning potentials. The search for commonalities across different modes, which do not have one-to-one correspondence, created anomalies for the

learners. This process of transmediation involved generative thinking and problem solving as new connections were made between expression planes.

Finally, it was demonstrated that in the context of online comic creation, transmediation was central to digital text production. This is because it involved translating semiotic content via discrete sign-making systems inherent in the digital interface. The children needed to learn the sign-system instantiated in the digital interface (e.g. flip, move, delete) to mediate their intended meanings. The digital interface contained a set of iconic meanings, with an internal logic that needed to be learned before its mediating potential for encoding texts was realised.

The increasing availability of digital technologies for textual production generates new possibilities for transmediation in young children's compositions. Teachers are providing children with rich opportunities for shifting meanings across multiple modes, rather than relying exclusively on the written word. Young children make sense of their world through multiple sign-making systems, long before they have developed sophisticated control of written text (Kress, 1997). As linguist Michael Halliday (1975) argues, rather than asking what does a student know, consider how many ways are available for this child to know. Encouraging children to engage in digital media creation, such as films, allows them to go beyond the simple reproduction of literary content to the transformation of meaning and knowledge, as Lauren proudly declared: "I'm making it different to the book."

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